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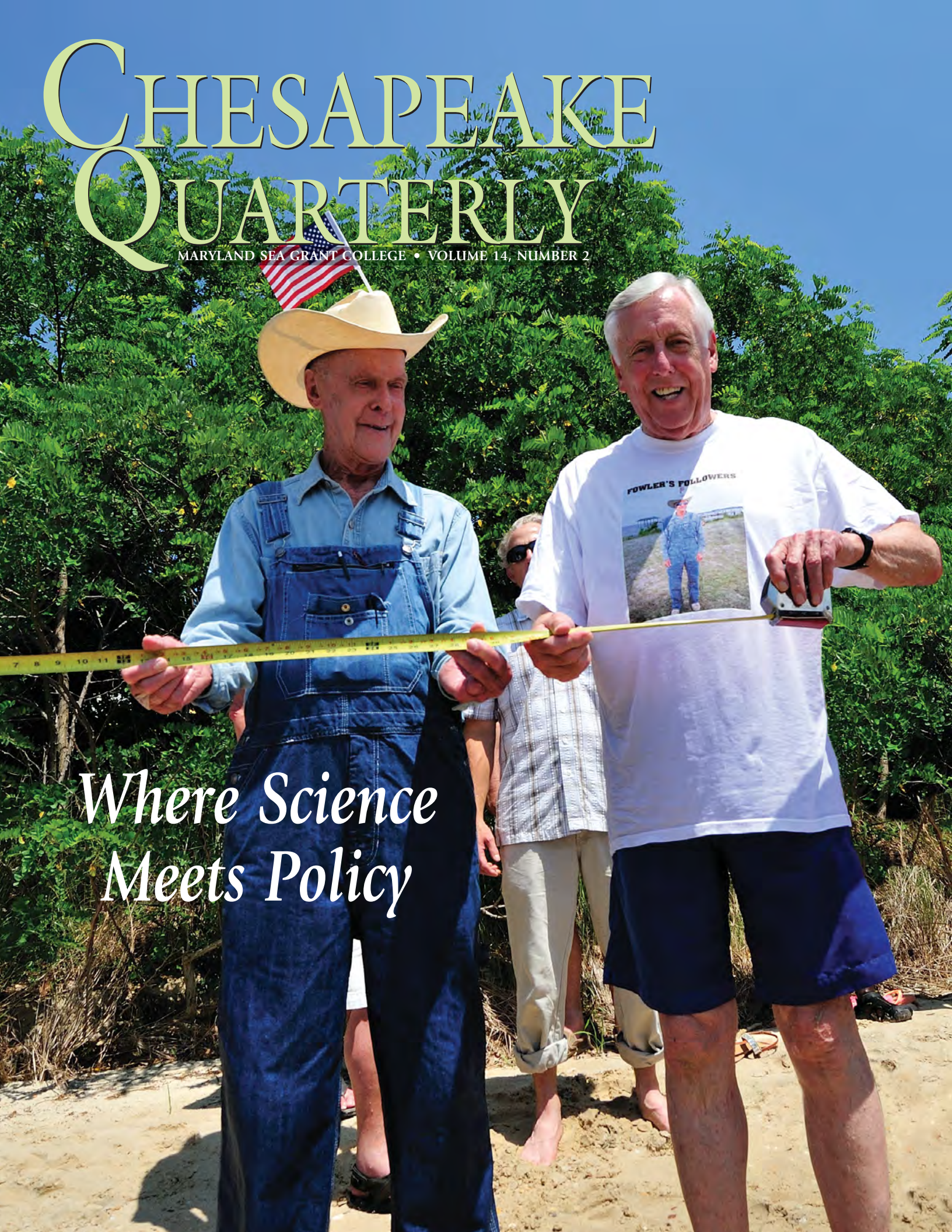

Where Science Meets Policy

contents

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Chesapeake Quarterly explores scientific, environmental, and cultural issues relevant to the Chesapeake Bay and its watershed. The magazine is produced and funded by the Maryland Sea Grant College.

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Cover photo: *Reading the tale of the tape measure are Maryland politicians Bernie Fowler, a former state senator, and Steny Hoyer, current U.S. congressman. The water clarity mark for June 14 at the 2015 Patuxent River Wade-In measured 44.5 inches of light penetration. The Wade-In, which focuses attention on the health of the river, has been conducted yearly since 1988.* ***Page 3:*** *Donny Eastridge pulls in a crab pot somewhere east of Chesapeake Beach. Steering the boat and checking the catch is Bobby Abner. New science-based policies restricting harvests have helped blue crab populations recover from historic lows.*
PHOTOGRAPHS, MICHAEL W. FINCHAM

Ball Games, Boat Trips, and Wade-Ins

Bernie Fowler has been running his annual Patuxent River Wade-In since 1988, and scientists and politicians have been showing up every year to go wading with him.

They come for several reasons: to keep alive their commitment to cleaning up the Patuxent River and to monitor the progress of the cleanup. They use the most basic of instruments: their eyes and their feet and a tape measure. How far out can they wade and still see their feet? When Bernie Fowler grew up on the river, he could wade out to shoulder depth and still watch blue crabs scrambling through the underwater grasses. When he saw the water grow cloudy, Fowler became a politician on a mission.

And they come to the Wade-In for another reason: to reconnect. The cleanup campaign Fowler launched as a rookie politician drew support from scientists he met through softball games against the Chesapeake Biological Laboratory (CBL), the research center at the mouth of the river. And his wade-in has kept that connection alive. Among the scientists on hand this year for the speeches and the music and the wading were Tom Miller and Walter Boynton from CBL.

Wading alongside the scientists were politicians committed to the cleanup cause. U.S. Congressman Steny Hoyer and Mike Miller, president of the Maryland Senate, both made speeches, and Hoyer, as he often does, made the official measurement (see cover photograph). This year's water clarity mark, he said, came in at 44.5 inches.

How can scientists connect with politicians and policymakers? It's an important question because most of us believe scientists can help policymakers reach the right decisions on complicated questions about environmental issues.

Serving on government commissions is one way scientists try to drive policy-making. They review the scientific literature, try to reach consensus, and then offer the best, science-based options for dealing with oysters or blue crabs or *Pfiesteria* fish kills or the sediments behind Conowingo Dam. Sometimes their findings become policy, sometimes not.

Serving as government advisers is another technique. Don Boesch, president of the University of Maryland Center for Environmental Science, now serves on the Governor's Bay Cabinet, along with the heads of the Departments of Natural Resources, the Environment, Agriculture, and Planning. He's working in a Maryland science tradition that dates back to 1925 when Reginald Truitt founded the Chesapeake Biological Laboratory. "My role is to tell the truth as I know it as a scientist," says Boesch. "And I will." Sometimes policymakers listen, sometimes not.

In this issue of *Chesapeake Quarterly*, however, we are looking at some of the less formal ways in which scientists and policymakers have built personal connections and worked together. In recent Bay history, relationships between scientists and policymakers, connections built on competence and character, have become important forces for environmental progress. "I have seen it frequently," says Ann Swanson, executive director of the Chesapeake Bay Commission. "To translate science into policy, there has to be somewhere in there a deep relationship of trust."

Where does trust begin? Sometimes during ball games and boat trips and community wade-ins. They have been the secret key to creating alliances that altered attitudes about environmental issues and helped create science-based policies for attacking the problems facing the Chesapeake Bay and its great tributaries.

— *Michael W. Fincham*

Crisis, Crescendo, Consensus

How Bay Science (sometimes) Changes Policy

Michael W. Fincham

If blue crab numbers start declining again in Chesapeake Bay — and they will at some point — then scientists and policy-makers will re-open some old debates about what policies to recommend for rebuilding the fishery.

Should they recommend that fisheries managers
a. *reduce the harvest of male crabs, or*
b. *reduce the harvest of female crabs?*

Which option would you choose? If you think the question is complicated, and it is, then you may want to try a yes-or-no question:

Should science findings play the deciding role in solving problems like this and setting policy for preserving the fishery?

Most people would probably answer yes — there is a widespread belief that science can show us the best way to conserve and manage the living resources of the Chesapeake.

If you answered yes to that question, you might think about this one:

How do science findings make their way into policy decisions about environmental issues?

The answer is not as simple as most people think. There is, it seems, a widespread fantasy that science findings flow easily and quickly into environmental policymaking. But that's not the case, according to Don Boesch, the president of the University of Maryland Center for Environmental Science. For the last 25 years he has been serving as science adviser on the Governor's Bay Cabinet.

This fantasy about the easy flow of science into policy has a name. Boesch calls it "the linear model," and it works like this: The flow of findings begins with researchers who develop what Boesch calls the new "and sometimes inconvenient truths of science." They hand off their findings to technical advisers who work with state agencies such as Maryland's Department of Natural Resources (DNR) or federal agencies such as the EPA. The technical staffers forward those findings up the line to department managers. On some issues those resource managers can take actions on their own. On other issues the managers lay out policy alternatives for the consideration of elected officials like legislators and governors.

"That's the food chain," says Boesch, "And that could not be farther from the truth."

Try another analogy: try thinking of science findings as a flow rolling down a ruler-straight river channel. At the upper end of the channel new research findings start to flow downstream. At the other end of the channel, those findings pour into the policymaking arena.

But the flow doesn't work that way in America, in part because of the nature of science, in part because of the nature of democracy. There is no straight-line, free-flowing channel leading from science to policy. "It's much more complex than that," says Boesch, and a number of other policy observers agree with him.

Here's one cause for the complexity: science findings about an issue may not always flow in the same direction and they may not give a clear answer to a policy question — at least not right

away. Take that opening question: what's the best option for rebuilding blue crab populations? Over the last two decades scientists at certain times have recommended Option A: reducing the harvests of male crabs. More recently they've been recommending Option B: reducing the harvest of female crabs.

It should be no surprise that scientists don't always agree with each other. They are trained, after all, to criticize each other's findings. As a result, science never seems to stop, it keeps moving shark-like to attack earlier findings, to develop new tools, to revise old paradigms, to rework any earlier consensus about problems and their proposed solutions. The process, essential to scientists, can be frustrating for policy makers who have to make decisions or recommend options. "When the hell is the jury in with science?" says John Griffin, former Secretary for Natural Resources in Maryland. "Well the jury is never in. There is always gray!"

And it should be no surprise that politicians who vote on policy issues are not comfortable with gray. Before they agree to any major policy change, they need a certain amount of security, says Ann Swanson who works with both scientists and politicians as executive director of the Chesapeake Bay Commission, a tri-state agency that advises the General Assemblies of Maryland, Virginia, and Pennsylvania. Security means confidence in any science-based recommendations — and confidence that those recommendations are widely understood and accepted by the voters who gave them their jobs. Politicians, after all, go through a new job interview with voters every two or four years. "Can you imagine every four years, if your employment went back to ground zero" says Swanson. "And other candidates were brought in to be interviewed?"

Security about new science can be hard to come by. Science findings flow into a policymaking arena that is often cluttered with competing groups: scientists who disagree with the findings, commercial fishermen or sportfishermen or farmers who dislike the findings, resource managers who can't see how they can apply the findings, advocacy groups who may want to publicize the findings — or bury them.

All that noise can leave politicians cautious about big changes. The result, according to Swanson: "Science-based policy making is incremental, it is about incremental change. It is only rare that you do something massive, like an all-out rockfish ban."

To understand what she means by incremental, consider the "crisis" of the oyster fishery. The great reefs in the mainstem and major river systems of the Chesapeake were allowed to drop to one percent of their historic levels. The decline of oysters and the near disappearance of a busy and profitable fishery developed over a century and a half, a time span dotted with numerous surveys, studies, and commissions, all designed to use science findings to save oysters and oystermen.

For much of that time, all the science findings from those studies and commissions produced only minor adjustments to policy: small oysters had to be thrown back, shell planting was tried for catching spat, seed oysters were moved around, harvest limits were reduced or expanded, power dredging was restricted to only two days a week. Incremental changes. Muddling through. Nothing radical. Nothing massive. No moratorium on harvesting, not even when stocks sank to one percent. No introduction of Asian oysters.

When science starts flowing downriver towards the policy arena, that stream often encounters dams, high walls thrown

up by political caution or public confusion or organized opposition by watermen or farmers or industries. A dam can slow the flow of science findings. Or let a trickle through. Or shut off the flow completely. Over time science findings can pile up behind those dams, just as springtime runoff rises up behind Conowingo Dam up on the Susquehanna River.

But on occasion large storms arise, say a policy debate, an environmental crisis, or a lawsuit. Under sudden stress the floodgates on the dam can suddenly open — and a lot of that backed-up science surges through and changes policy in dramatic ways: a Chesapeake Bay cleanup is started, a ban on phosphates in detergents is passed, a moratorium on striped bass fishing is enforced, harvests of blue crabs are reduced, oyster sanctuaries are suddenly expanded (see A Bay Timeline, p. 6).

"I think there are these fleeting moments when you can get information through," says Boesch, moments when the normal processes of science and of democracy no longer slow the flow. "Why should it be different than anything else in life, including evolution, punctuated equilibrium, or traffic," he says. "You make significant progress only in short spurts."

This crisis-as-progress view of recent environmental history has its true believers and its non-believers. And it has some half-believers like Ann Swanson, who has been watching policy battles for 27 years. When massive and abrupt policy shifts are put in place, she says, those changes are not as sudden as they appear. As with any exciting movie, science-based policy making, at least according to Swanson, follows a three-act structure: crisis, crescendo, consensus.

A policy crisis arises, it moves through a crescendo stage, a wave of surging public attention to an issue. Science findings come together, media attention expands, political negotiation ensues, the general noise level of discussion and debate keeps ramping up. In lucky cases, the crescendo concludes with a consensus among scientists and some confidence among politicians about which policy choices make the most sense.

A crescendo, however, can take a long time to raise the decibel level. Sometimes it starts with leadership, a scientist or politician or activist willing to speak out. A rookie politician like Bernie Fowler raises the alarm about sewage pollution in the Patuxent River back in 1970s, then an experienced politician like Senator "Mac" Mathias raises the alarm about the entire Chesapeake Bay.

More often, though, the first drumbeats come from an environmental organization or a policy commission, from a sportfishing group or a commercial fishermens association or an industrial lobby, each of them pushing an agenda important to their members.

For science to get a hearing amidst the rising din, says Swanson, there have to be translators in the game: scientists who can explain science to the rest of us in language we can understand, writers who can explain science in stories we want to read, and allies in the advocacy commu-

"You get to a place where you can change things," *says Ann Swanson (above). "When the community is witnessing a problem, and the scientists are observing it, and when the writers are talking about it." As executive director of the Chesapeake Bay Commission, Swanson works with scientists and politicians to help the Commission advise the General Assemblies of Maryland and Virginia and Pennsylvania on Bay issues. Don Boesch (opposite page), president of the University of Maryland Center for Environmental Science, serves as chief science adviser on the Maryland Governor's Bay Cabinet.* PHOTOGRAPHS: ABOVE, MICHAEL W. FINCHAM; OPPOSITE PAGE, ANNE GAUZENS

nity who can lobby for applying recent findings to recurring issues.

Translators can often be found in large advocacy organizations and they can play a major role in policy debates, says Will Baker, president of the Chesapeake Bay Foundation. These organizations keep scientists on staff who follow current research and synthesize and interpret its findings for legislators. All these translators don't have to play in the same key or follow the same score. What counts is that they play, that they raise the noise level.

To understand how a crescendo can work, consider the case of the last "blue crab crisis." By 2008 the blue crab fishery was facing an apparent collapse, the result of a decade that had brought declines in recruitment and increases in fishing pressure. As a result, a historic and radical policy change was put in place that year. The states of Maryland and Virginia and the Potomac River Fisheries Commission broke with a long record of non-cooperation and agreed to jointly reduce the harvest of female crabs. And the cutback was significant: a 34 percent reduction in the number of female crabs that watermen could harvest.

"There are these fleeting moments when you can get information through. You make significant progress only in short spurts."

The crisis was clear, but the crescendo of public discussion and political debate took more than a decade to build. The prime builder, in this case, was the Bi-State Blue Crab Advisory Committee (BBCAC), a multi-year effort that brought together groups from both states to talk with each other about crab science and management. Organized in 1996 by Swanson's Chesapeake Bay Commission, BBCAC set up workshops and conferences where all the stakeholders — legislators, watermen, seafood processors, and resource managers — were able to watch scientists publically disagreeing with each other. Should Maryland and Virginia reduce the harvest of male crabs? Or female crabs? By how much? For how long? What about threshold levels? Or target levels?

It was a learning experience for everybody. "Scientists are trained to tear each other's work apart, that's what peer review is," says Swanson, but policymakers need to see scientists come to some basic agreements about workable options. "When you have all of them [the scientists] shaking their heads in the same direction, you know you have a crescendo that is at a level where you have to really listen."

By the time Maryland and Virginia "suddenly" decided to take action in 2008, the scientists had worked out a

Crisis, Crescendo, Consensus: A Bay Timeline

1973

Mathias Boat Trip: Charles "Mac" Mathias, a U.S. Republican senator, organizes a five-day boat trip and discovers firsthand from scientists, watermen, and environmentalists that the Chesapeake Bay is in dramatic decline. He begins organizing political support for a multi-year, in-depth scientific study by the Environmental Protection Agency (EPA).

1975

Kepone Fishing Ban: Scientists find evidence of a pesticide called Kepone in sediments, oysters, and finfish, forcing the governor of Virginia to ban oystering and fishing along a 100-mile stretch of the James River, reaching down to the mouth of the Bay.

1977-1981

Bernie Fowler Lawsuits: Led by state Senator Bernie Fowler, three Southern Maryland counties file lawsuits forcing the state of Maryland and EPA to devise a new water quality plan for the river. Scientists at the Chesapeake Biological Laboratory (CBL) provide key evidence documenting the role of nitrogen and phosphorus in degrading the river.

1977

EPA Bay Study: The EPA begins a five-year $27 million study of the Bay with funding secured by Senator Mathias. Scientists focus their research on submerged aquatic vegetation and inputs and effects of toxics and nutrients.

1979

Harry Hughes Boat Trip: Maryland governor Harry Hughes tours the lower Patuxent River with CBL scientists & officials from 3 Southern Maryland counties. The conditions they witness – turbid waters, dead oysters, & depleted oxygen readings – prompt Hughes to commit the state to better management of the river and its watershed.

1981

Patuxent River Charrette: A 3-day conflict-resolution technique brings together scientists, citizen activists, & officials from 7 counties, the state of Maryland, & the Washington Suburban Sanitary Commission. They reach consensus on a cooperative strategy to begin restoring the river's water quality.

1982-1983

EPA Releases Bay Findings: The 5-year study identifies nutrients as the major systemwide problem, causing declines in underwater grasses & the rise of dead zones of low oxygen. Citizens, scientists, & environmental organizations call for a plan to use those findings to clean up the Bay.

First Chesapeake Bay Agreement: Governors from 3 states sign a pledge to work on reducing pollution & restoring the ecological health of Chesapeake Bay. The agreement establishes an executive council, an implementation committee, & an EPA Chesapeake Bay Program office in Annapolis.

1985

Phosphate Ban: Governor Hughes signs a bill banning phosphates from detergents sold in Maryland, ending a 4-year legislative battle between environmental organizations & detergent industry lobbyists. Within 2 years, Maryland phosphorus loadings decline by 16-21%. Bans follow in the District of Columbia (1986), Virginia (1988), & Pennsylvania (1990).

Rockfish Moratorium: Based on new research, the state of Maryland declares a moratorium on catching & selling rockfish. Virginia later bans fishing in spawning areas before finally imposing a total fishing ban 4 years later. Striped bass populations increase from less than 9 million in 1982 to more than 70 million by 2004.

consensus, the public had been paying attention, and the politicians had reached a level of security they needed. Watermen and crab house operators are voters, after all, and they weren't going to be happy. Maryland crabbers weren't going to catch as many females as they made their annual autumn migration towards the southern Bay. And Virginia watermen were going to be shut out of a historic winter dredge fishery that let them dig up pregnant females buried in the mud.

Crisis, crescendo, consensus: the whole process seemed to work. That last crab crisis opened the floodgates for blue crab science. It led to a major change in harvest policy. And it left a legacy: scientific consensus about biological reference points, targets and thresholds, the data that can help fisheries managers know when and where and how to adjust harvest levels and harvest gear and harvest seasons in order to sustain blue crab populations through boom years and bust.

Four years after the harvest cutback was announced, the Governor of Maryland stood on the back deck of a local crab house in May 2012 and announced there were more blue crabs in the Bay than any year since 1993. The estimate from the winter dredge survey put the population at 764 million blue crabs, a number that doubled the average annual counts during the decade before any crisis-level cutbacks were put in place. The "blue crab crisis" subsided — at least for a while.

A different kind of crescendo followed that announcement. Scientists and policymakers and politicians were applauded in the press — and justly so. They had worked through to consensus on the science and then consensus on the policy options. That let them make the smart, tough management decisions that helped an essential fishery recover from crisis.

— *fincham@mdsg.umd.edu*

Videos, Articles Online

You can find additional material on our magazine web site related to the topics covered in the print issue of this *Chesapeake Quarterly*. Video clips feature the late U.S. Senator Charles "Mac" Mathias and former Maryland state Senator Bernie Fowler talking about their roles in the Bay cleanup. In addition, two articles by Jeffrey Brainard discuss recent research surveys that assess public opinion about scientists:

Do Americans Trust Scientists?
Do Marylanders Trust Scientists on Climate Change?

To access these items, visit:
www.chesapeakequarterly.net/v14n2

Science findings often play a major role in designing policies to improve management of the fisheries and water quality and environmental resources of the Chesapeake Bay system. Especially during moments of environmental crisis.

1987

Second Chesapeake Bay Agreement: The partners begin establishing a more specific, goal-oriented framework, setting 32 specific commitments in 6 broad areas: water quality, living resources, public access, population growth and development, public information and education, and better coordination.

1997

***Pfiesteria* Outbreak:** A toxic organism *Pfiesteria piscicida* is blamed for causing sick fish and sick fishermen on the Eastern Shore. Scientists identify runoff of chicken manure as a probable cause for toxic blooms. New legislation requires farmers to submit nutrient-management plans to the state.

2000

Site 104 Debate: The state of Maryland drops plans to place sediment dredged from shipping channels into a deep site just north of the Bay Bridge.

Third Chesapeake Bay Agreement: The signatories set 102 commitments in 5 categories, calling for measurable progress and more regulatory actions in a partnership that was once completely voluntary.

2008

Blue Crab Crisis: After a decade of declines in the Bay's blue crab populations, a cutback on the harvest of female crabs is put in place by Maryland, Virginia and the Potomac River Fisheries Commission. Virginia suspends its historic winter crab dredge fishery.

2009

Rejection of Asian Oysters: After numerous studies and completion of an Environmental Impact Study, Maryland and Virginia and the Army Corps of Engineers decide not to allow the introduction of *Crassostrea ariakensis*, a fast-growing Asian oyster favored by Virginia oyster growers.

Maryland Oyster Policies Revised: The Governor's Oyster Advisory Commission, chaired by William Eichbaum, recommends expanding oyster sanctuaries and opening more Bay bottom to leasing for private aquaculture.

2010

TMDL Lawsuit: The Chesapeake Bay Foundation and EPA settle their lawsuit with a binding agreement calling for EPA to establish the Chesapeake Bay Total Maximum Daily Load (TMDL), putting the Bay on a "pollution diet."

Current Crises?

Phosphorus Management: What are the options for reducing the runoff of phosphorus from the farms of Pennsylvania and the Eastern Shore of Maryland?

Conowingo Dam: What should be done about the all the sediment coming down the Susquehanna River, most of it from Pennsylvania? Now trapped behind the Conowingo Dam, that sediment is at risk of being scoured out by the next great storm and released into the Chesapeake Bay.

Game Days along the Patuxent

Scientists and Politicians Learn to Play Ball

Michael W. Fincham

A summertime softball game down in Southern Maryland back in the 1970s may have been a watershed moment for the movement to clean up Chesapeake Bay.

A team made up (mostly) of scientists from the oldest marine lab on the Bay scheduled a game against a team made up (mostly) of military veterans. And the veteran playing second base was a politician named Bernie Fowler, a lean and athletic man in his late 40s who had just won his first electoral campaign by promising to fight for a cleanup of the Patuxent River.

These were two teams with different approaches to softball. The scientists came from the Chesapeake Biological Laboratory (CBL), the old marine research center operated by the University of Maryland and located at the mouth of the Patuxent River down at the southern end of Calvert County, Maryland. They called their team "The Drive Ins" because their player/coach, Joe Mihursky, used to play shortstop for a team sponsored by the only drive-in movie theater the county ever had.

When the drive-in went dark forever, Mihursky put up his own money to sponsor a team from the science lab. Some of his players, like Don Heinle out in right field, did better at science than at softball, so Mihursky added a couple state troopers to the lineup and another player from the nearby naval base. But the main focus of the team was having fun. The coach even recruited cheerleaders of sorts, summer school girls who would dress up in shorts and red, white and blue tops and pretend they were the first base and

third base coaches. After every game came a picnic or beer drinking or both.

When the scientists thought they were ready for a road game, they took on an upcounty team that was a little more serious about its softball. Bernie Fowler's team was sponsored by Post 8133 of the Veterans of Foreign Wars. It drew players from all over the county, it held tryouts, it had recently won the county championship in fast-pitch softball. "Veterans would kind of migrate towards our team," said Fowler, a WW II vet, "and if they played pretty fair ball, our manager would go ahead and sign them up." If they didn't play well, they sat on the bench. The focus was winning games. "We had a good team," said Fowler. Since he played "pretty fair ball," he didn't sit on the bench.

When the scientists played the veterans, the veterans won. At least that's the way Fowler remembers it and he has always been serious about his softball. He thought there was a patched-together quality to the lab team from down at the tail end of the county, and he remembers getting a couple hits against the scientists and making some good plays at second base. "I think we won the game," he says some 40 years later, "but that was unimportant." What was important for the new politician was the chance to meet scientists who were studying the river he was trying to clean up.

A summertime softball game seems an odd way for scientists to connect with policymakers. But around the Chesapeake Bay both scientists and policymaker have connected in a variety of ways during episodes of environmental crisis and debate. Scientists have ridden with politicians on boat trips and helicopter trips, they've testified before legislative committees, advised state agencies, and served on various commissions focused on oysters and blue crabs and striped bass. Some of those forays proved very productive, some not so much. This particular softball game proved highly productive.

The day Bernie Fowler played against "The Drive-Ins" from CBL, he met a scientist who was eager to work with a politician who was willing to push an environmental cause. At the post-game picnic, a marine biologist named Don Heinle sought out Fowler, pulled him aside, and told him there was good reason to worry about the Patuxent. "Look, you're right on target," Heinle said. "Things are changing out there." The biologist was eager to talk because he had recently found something interesting among several old research reports: scientific data showing how much the river had changed in recent decades.

The politician didn't have hard data, he had hard experience. Fowler had grown up along the river where he'd spent time wading in the clear shallows and hand netting for the blue crabs he could see scuttling through the seagrass. After serving in the Navy during World War II, he came home, got a business loan, and opened a restaurant and boat rental business back on the river.

Apparently you can go home again, but you can't step in the same river twice. After opening his riverside business, Fowler watched his boyhood river change: the clear shallows grew cloudy, the oysters grew scarce, the seagrasses dwindled. He decided to run for the job of Calvert County Commissioner to see if he could do something about cleaning up the river.

At this softball picnic the newly elected politician found himself for the first time listening to a passionate scientist lecture him about something called eutrophication, how it worked, how an oversupply of nutrients like nitrogen and phosphorus could cloud the water and lower oxygen levels. The lecture didn't last long. "I am not a scientist," Fowler said, stopping Heinle. "So you are going to have to make it simple so I can understand it." Heinle said he would give Fowler all the time and all the information he needed. They sat and talked together for an hour.

They were serious about their summertime softball *in Southern Maryland back in the 1960s. Joe Mihursky (above) wore long sideburns, played for several county teams, and organized a team of scientists from the Chesapeake Biological Laboratory. Bernie Fowler (opposite page) preferred fast-pitch softball over slow-pitch because he could beat out bunts and steal bases. They called him "Flash" when he played with the local VFW Post and later with the Trinity Memorial Methodist Church. His uniform still fits him at 91.* PHOTOGRAPHS: ABOVE, COURTESY OF WALTER BOYNTON; OPPOSITE PAGE, MICHAEL W. FINCHAM

Other conversations soon followed. The softball game was the beginning of a friendship that would change both their lives. Heinle promised he would back up Fowler's crusade with scientific evidence that might help him highlight the problems with the river. And Fowler promised he would use any evidence Heinle could give him.

In his science career Heinle focused on plankton, the tiny, floating plants and animals that help form the base of the aquatic food chain. Under certain conditions those populations help produce oysters and blue crabs, striped bass and hard heads and the rest of the bounty the Bay is famous for. Under other conditions, when plankton are overfertilized by too much nitrogen and phosphorus, they produce cloudy water, low oxygen levels, dead zones, fish kills, and crab jubilees that send crustaceans scrambling to shore to find oxygen.

Around the lab, Heinle was well liked. He was funny guy, said one colleague, "a science guy" who could seem slightly dorky with his large, round glasses, his absent-minded air, and his habit of showing up late for any and every meeting. He was generally on time to have fun, however, and the story went round the lab about the Ocean City conference where he and a colleague took the door off their motel room and went "door-surfing" in the Atlantic. He also showed up for the softball games that Mihursky organized and for the lunchtime volleyball games that went on year round, even in the snow.

He wasn't a first-rate ballplayer, at least according to his coach, but he was a dogged scientist, determined to dig up data about the river and passionate about sharing what he found. Deep in the attic of CBL he found old surveys and studies done decades earlier by biologists R.P. Cowles of the Johns Hopkins University and Carroll Blue Nash of American University. Their data put hard numbers on what Heinle suspected and what Fowler had seen with his own eyes: the river once had healthier levels of light penetration and dis-

solved oxygen — and now the river was moving in the wrong direction. "He was damned upset about it," said his CBL colleague, Walter Boynton. "Just like Bernie."

The scientist had found the perfect politician, a strong-willed native who was passionate about cleaning up the river that Heinle was studying. The politician was stunned to learn that water clarity, according to the old data, used to reach 12 feet down in places. "He knew what was wrong with the river," said Fowler describing Heinle, "and what needed to be done to clean it up." What was needed to save the lower Patuxent, said Heinle, was a cutback on all the untreated and poorly treated sewage flowing into the upper Patuxent from all those upriver wastewater treatment plants.

Outspoken environmental advocacy would prove a good career move for a regional politician, but not, however, for a young scientist, at least not in the 1970s. Fowler began to gather followers for his crusade by citing dramatic data and quotes from Heinle to raise concerns about the river's decline and to recruit other Southern Maryland politicians to his cause. "Don made some very strong statements and I quoted him," said Fowler. "Whatever he told me became my marching orders." Heinle's willingness to speak out, however, would not help his career.

They were poking a sleeping giant. According to Heinle's scenario, the lower Patuxent was being degraded because the upriver counties needed convenient and cheap sewage disposal. They could keep expanding their wastewater treatment plants, their planning departments could keep doling out new sewage hookups, developers could keep building new subdivisions, a huge housing boom could proceed apace around Baltimore and Columbia and Washington D.C.

Regional and cultural battle lines began to form. According to Fowler and his supporters, a rural, river-centered way of life was being sacrificed to support a growing suburb-centered way of life. Their message struck a chord: the commissioners from the downriver counties — Calvert, Charles and St Mary's — began asking for more limits on wastewater inputs from the upriver counties: Anne Arundel, Howard, Prince George's, and Montgomery.

Heinle was Fowler's first science mentor, but there would soon be others. Through Heinle, Fowler began connecting closely with a number of other scientists from CBL including George Krantz and Joe Mihursky, the player-coach for the lab softball team. It would be a long-running connection with Fowler working closely over the years with Bob Ulanowicz, Chris D'Elia, and Walter Boynton. "It was like I became a member of the family," Fowler said.

It was the beginning of an important alliance between marine scientists and regional politicians, two groups that do not always connect with each other. Alliances like this are a key, often invisible step in moving science into the public policy arena, says Ann Swanson, long-time executive director of the Chesapeake Bay Commission, a policy agency created to advise the legislatures of Maryland, Virginia, and Pennsylvania. "These teams of people, from my experience, are not pre-determined or pre-organized," says Swanson. "They happen in a random destiny kind of way." And sometimes destiny shows up at a softball game. "Unless you have that happening, [science] can't jump from the bench into the policy arena."

He may have been a so-so softball player, *but as a scientist Don Heinle (opposite page) was strong willed, prepared to speak out in support of Bernie Fowler's campaign to clean up the Patuxent River. At one of his early wade-ins in the 1980s (above), Fowler (far right) finds some seagrasses, a hopeful sign. Standing to the left of Fowler are Tom Wisner, the folk singer who wrote a poem about the wade-in, and Walter Boynton, another CBL scientist and close friend who has worked with Fowler for more than 25 years.* PHOTOGRAPHS: ABOVE, MICHAEL W. FINCHAM; OPPOSITE PAGE, UMCES CHESAPEAKE BIOLOGICAL LAB

It was a timely alliance. Scientists at CBL were in the middle of developing a deeper and revolutionary analysis of the important but different roles that nitrogen and phosphorus play in river systems and in the mainstem of the Bay. Under debate was a new thesis: phosphorus, which was cheaper to remove from sewage, seemed to play a damaging role in freshwater reaches of the river, but new research was suggesting that nitrogen, which was more expensive to remove, might prove the more dangerous nutrient in the saltier downstream stretches of the river. A number of scientists, including Mihursky and Boynton, were widening their lab's focus to look at how entire watersheds affected river systems.

As Heinle and his colleagues began educating Fowler, the politician returned the favor. Before long he was schooling his mentors in the various ways of creating and applying political power to environmental issues. He gave speeches, staged boat rides, and everywhere he spoke he told his story about wading out as a child and young man into a river that was so clear he could see the blue crabs scuttling through the seagrass meadows. In later years he would even organize his annual community wade-ins to monitor the state of the river and keep the cause alive. (Fowler led this year's wade-in on Sunday June 14.)

It's now clear that Fowler was an early adopter and in some cases a pioneer at trying out many of the techniques that are now found in the tool kit of many environmental advocates. And for all those events, he recruited key scientists to play on his team. They learned that the softball player was also willing to play hardball.

In trying to save the Patuxent, Fowler's team found itself playing a powerful team: the politicians and agencies in charge of environmental policies for the state of Maryland. The state's official message during the 1970s was simple: the Patuxent River was a healthy body of water. And the state's official messengers included Governor Marvin Mandel and his new head of the Department of Natural Resources, James B. Coulter, a sanitary engineer whose specialty was wastewater treatment plants. Coulter personally delivered the message to CBL scientists: he called Heinle and told him to stop his public comments about the river's decline. When Heinle refused, Coulter told his boss, Pete Wagner, that the university should fire the outspoken scientist.

Fowler's political allies got the state's message when Coulter drove down to Calvert County and spoke at an annual dinner held at the Rod and Reel Club at Chesapeake Beach. His speech set the record straight: nitrogen and phosphorus fertilize the estuary and produce food for fish, all estuaries tend to be cloudy rather than clear, and there was no scientific evidence proving that this river, the Patuxent, had ever had clear waters. There were only "anecdotes" in place of evidence and the most famous anecdote, Bernie Fowler's story about seeing crabs at his feet, was probably wrong. When Bernie saw those crabs he was a little boy, not a six-foot man, said Coulter, and his eyes were simply closer to his feet.

The game was on. "If you want their attention, you're going to have to sue the bastards," said a veteran local politician after hearing one of Fowler's impassioned speeches. "Sue the bastards," says Fowler, became the popular slogan for officials in Calvert, St. Mary's, and Charles Counties, the three counties bordering the lower reaches of the Patuxent. At Fowler's urging the commissioners of all three counties agreed to spend public funds to launch a lawsuit in the late 1970s against the state of Maryland and the Environmental Protection Agency.

The focus for the lawsuit was the water quality plan for the Patuxent River that the DNR and EPA had agreed to follow over the next 20 years. By the year 2000 under this plan, nearly 80 percent of the river's summertime flow would be water from sewage treatment plants in the fast-expanding upriver counties. And none of those plants was trying to remove nitrogen from the sewage.

The lawsuit put Don Heinle and his CBL colleagues on the spot. The suit would require evidence that the State of Maryland was allowing damage to the river, and that evidence would have to come from employees of the state of Maryland: the scientists who were so eager to educate Bernie Fowler. The old reports that Heinle had dug out of the

attic at CBL played a key role in the case, providing proof that the Patuxent had better clarity, more seagrasses, and higher oxygen levels during earlier decades.

A number of university scientists would give evidence supporting the case against the state. Heinle, Joe Mihursky, and George Krantz all worked at CBL, and another expert witness, Rita Colwell, was a marine microbiologist at the university's College Park campus and director of the new Maryland Sea Grant Program.

In 1979 Fowler sat in the third row in the U.S. District Court for the District of Columbia and watched his lawyer David Fleischaker go to work with all his science evidence. And on the other side of the court, Fowler saw half a dozen attorneys representing the state of Maryland and the federal government. Behind the bench sat a tough-minded judge nicknamed "Maximum John," probably the most famous person in the courtroom. During the Watergate Scandal, Judge John J. Sirica ordered President Richard Nixon to turn over all the tapes of his conversations with his staff, hastening the fall of his presidency.

"Maximum John" lived up to his nickname again. Sirica ruled in favor of the Southern Maryland team. The water quality plan put together by Maryland and the EPA was, he said, little more than an accommodation for wastewater treatment plants. The federal government had recently authorized $40 billion for upgrading the nation's wastewater treatment plants, but Sirica ruled that Maryland would not get any of those funds until it came up with a better, science-based plan to restore water quality in the Patuxent.

James Coulter would not be working on the new plan. A new governor named Harry Hughes took office in 1979 and removed water quality and environmental programs from Coulter's DNR. He decided to create a new Office of Environmental Programs, to place it under the Department of Health and Mental Hygiene, and to appoint as its leader Bill Eichbaum, an environmental lawyer with 10 years of experience in environmental law enforcement and a tendency to take tough stands on controversial issues.

"He had the courage of his convictions. He refused to be pushed around or throttled. He stuck to his guns."

— Bernie Fowler on Don Heinle

The lawsuit wasn't the last inning in the game Fowler was playing. He quickly invited the new governor on a boat trip, and Harry Hughes, a tall, quiet-speaking lawyer from the Eastern Shore, accepted the invitation to learn first hand the problems facing the lower Patuxent River. On the boat he met local watermen and heard lectures from Heinle, Mihursky, Krantz, and a rising young scientist named Walter Boynton. He also saw cloudy water, dying oysters, and depleted oxygen readings.

Boat trips were becoming a classic tool for raising public awareness and winning political commitments for environmental causes. With his boat trip, Fowler was taking a page from the playbook of Senator Charles "Mac" Mathias, the Republican senator who used a five-day boat tour back in 1973 to create support for a Chesapeake Bay cleanup (see Chesapeake Crossings, p. 13).

Shortly after Governor Harry Hughes stepped off the boat, he went on record for cleaning up the Patuxent River. He handed the problem off to the chief for environmental programs and Eichbaum responded with an unusual approach: he organized an event he called a "Patuxent River Charette" that called key citizens, scientists, and environmentalists together and stuck them in a room with officials from state agencies, seven separate counties, and the Washington Suburban Sanitary Commission. Cloistered for three days in a Catholic convent in Howard County, they went to work on hammering out a new water quality plan for the river.

The result was a new plan and a promise that three of the waste treatment plants on the upper Patuxent would begin removing nitrogen as well as phosphorus. The long range goal: restoring the river to water quality levels found in the 1950s. With the agreement in place, the state could begin accessing that federal money for upgrading sewage treatment plants.

Bernie Fowler wasn't finished. In 1982 he was elected to the Maryland State Senate where he served until 1994 as a leading voice for the Chesapeake Bay cleanup. In 1988 he organized the first Bernie Fowler Wade-In down at Broome's Island, an annual event to test the clarity of the river and monitor the progress of the cleanup. Citizens, scientists, and politicians gather at the river, walk out, and look down, hoping when they are waist deep to see their feet at the bottom of the river. The real goal, of course, is keeping the cause alive.

Don Heinle never walked in a wade-in. In 1982 he left the Chesapeake Biological Laboratory after he was denied a promotion he thought he deserved, a promotion he "richly deserved," said one colleague. His friends, of course, threw him a going-away party. Expecting him to show up late as usual, they gave him a watch inscribed on back with "Finally Heinle." With a wife and baby daughter to support he moved to the West Coast and went to work in private industry. He was only 63 when a heart attack struck him down.

"When they called me and told me he had died, it kind of cracked my heart," said Fowler. "I often said I couldn't spell eutrophication until I met Don Heinle. He had the courage of his convictions. He would refuse to be pushed around or throttled. He stuck to his guns." At his next wade-in Fowler held a

memorial service for his friend, reading a eulogy and casting a wreath on the waters of the river Heinle had tried to save.

The passion, tools, and techniques pioneered by Fowler and his team during their Patuxent River insurgency have been adopted elsewhere. Every year Fowler attends a number of wade-ins that citizens have started up on other rivers around the region. His approach also has its echoes in the country's riverkeeper movement that began on the Hudson River in 1983. From the beginning they used science, citizen activism, and lawsuits to fight for river cleanups. According to the Waterkeeper Alliance, 19 riverkeepers are now working in the Chesapeake region.

When he was 70 years old Fowler left the Maryland Senate, but he kept playing softball. When he was 85 years old, he finally retired from softball, but he kept playing in the Bay cleanup game. In 2009, he was co-plaintiff in another major lawsuit, this one filed by the Chesapeake Bay Foundation.

This lawsuit, much like his long-ago suit about the Patuxent River, would prove historic. It required EPA to set up a system that defined a Total Maximum Daily Load (TMDL) of sediments and nutrients that would be allowed for each river system.

The goal was familiar: to put the entire Chesapeake Bay on a "pollution diet" much like Bernie Fowler and Don Heinle had tried to do years before on the Patuxent River.

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Chesapeake Crossings

The Voyages of "Mac" Mathias

***Charles "Mac" Mathias** served in the U.S. House of Representatives for eight years and in the U.S. Senate for 12 years.* PHOTOGRAPH, ASSOCIATED PRESS

Michael W. Fincham

The cleanup of the Chesapeake Bay began with a boat trip, but it's probably not the famous trip you've read about.

According to the familiar narrative, U.S. Senator Charles "Mac" Mathias launched a historic, well-publicized boat trip in June 1973 that would last five days and carry him to key ports of call around Maryland's portion of Chesapeake Bay. The tour, as planned, turned into a major media event that helped Mathias publicize the pollution problems of the Bay and persuade Congress to fund a major scientific study of the estuary. These were rare acts of political leadership that earned this Republican senator from Frederick, Maryland lasting fame as "the father of the Chesapeake Bay Program," the current multi-state campaign to clean up the Bay.

His legendary trip began at the Port of Baltimore in the middle of a downpour, with Mathias cruising away from the dock on a friend's 43-foot motorboat, the *Miss Afton IV*. On their way out of the harbor, he and his party passed several large industrial plants, hulking and grim-looking in the heavy rain. Near Fells Point, they saw Allied Signal, already known to be steadily leaking chromium into the Patapsco River, and at Sparrows Point they motored along a ship yard and a steel-making plant run by Bethlehem Steel, a corporation notorious for discharging wastewater into the harbor.

In 1973, the enemy of the Bay, at least in the popular imagination, was big industry. The rise of the environmental movement during the previous decade had been sparked, in part, by a couple of famous industry-connected crises: an oil spill set the Cuyahoga River on fire near Cleveland, Ohio; another oil spill blackened the beaches near Santa Barbara, California (yes, that happened again in May of this year). Those images from the 1960s raised concerns about Bethlehem Steel near Baltimore. "For many Marylanders," said Mathias, "it was the industrial activity at Sparrow's Point that was poisoning the whole Bay." The senator suspected otherwise.

In his pre-launch press conference Mathias called his excursion "a fact-finding tour." Today a politician might call it a "a listening tour." The senator would travel more than 400 miles, most of it

by boat, some of it by airplane, some of it by car. Along the way he would meet and talk with and, yes, listen to more than 150 Bay-area residents. He would hear troubling reports from local politicians, businessmen, farmers, fishermen, watermen, and scientists.

Why did a politician born and raised in Frederick, Maryland, a freshwater town within sight of Catoctin Mountain, turn into such a fervent advocate for the Chesapeake Bay? Because this wasn't his first trip on the Bay and this was not the Bay he remembered.

Mathias first fell in love with the Bay during some long-ago trips he took as a boy. "One of the great expeditions of a child in Maryland," he said, "was to take a trip across the Bay on one of the old ferryboats." They ran once upon a time from Annapolis over to Claiborne on the Eastern Shore, crossing the Chesapeake Bay and part of Eastern Bay, and marking at least one passenger for life.

"It was an extraordinary experience," Mathias told me during an interview I did with him late in his life. He would wait by the seawall near the Naval Academy, he said, and the *John M. Dennis*, a wide-bodied, double-ended ferry, would pull up and unload people and cars from its previous trip. He would ride aboard with his family, jump out of the car, and begin racing about the big deck as the ferry pushed away from the shore with a loud whistle and a snort of black smoke.

More than sixty years later, decades after the Bay Bridge opened, decades after the ferries were mothballed, that memory still burned brightly. "I can see the churning of the water," he said, "as the boat was leaving the dock."

Out on the Bay on a slow boat to a far shore, the boy from Frederick would lean over the railing and stare out across the water. "We had time to reflect on what was happening and to imagine the marine life that was beneath us — the crabs, the oysters, the rockfish, all the rest." It was a voyage of discovery, and in his boyhood mind, he said, the barge-like *John M. Dennis* belonged in any pantheon of great expeditionary ships, right alongside the *Ark* and the *Dove*, or better yet the *Nina*, the *Pinta* and the *Santa Maria*.

A ferryboat that could hold up to 65 vehicles and 880 passengers, *the* John M. Dennis *ran from Annapolis to Claiborne on Maryland's Eastern Shore when "Mac" Mathias rode it as a child. The trips gave him a lifelong love of the Bay, and as a senator, he worked to help clean up the estuary. Eugene Cronin (opposite page), a leading expert on blue crab biology and head of the UMCES Chesapeake Biological Lab, served as Mathias's science advisor, and became a close friend.*

His in-depth understanding of the Chesapeake began years later when he was a 37-year-old lawyer newly elected to the Maryland House of Delegates. Assigned to the Chesapeake Bay and Tributaries Committee in 1959, he met and began a long connection with Gene Cronin, the marine biologist who was serving as a principal adviser to the committee. A teacher-turned-biologist-turned-lab leader, Cronin was then director of the Chesapeake Biological Laboratory (CBL), the old research center down at Solomons Island. A charismatic and eloquent speaker, Cronin was called "The Silver Fox" by his colleagues. In Cronin, Mathias found a science mentor, a man he called "a natural teacher" who excelled at explaining Bay science.

In 1973 Mathias would organize his "fact-finding" tour, in part because he remembered the ferryboats, in part because he liked to go goose hunting. In cold, early morning, Eastern Shore duck blinds he discovered first hand that geese were dwindling in numbers. From his hunting buddies and his science buddies, he heard similar stories: the waterfowl were going elsewhere because the seagrasses, their favorite food source, were disappearing. And nobody knew why.

On his official five-day boat tour he found himself collecting more stories about a Chesapeake Bay in accelerating decline. The water was growing cloudy, raw sewage and industrial wastes were pouring into the Bay, harvests were declining for oysters and crabs and fish, watermen and seafood processors were going out of business. And the year before, 1972, had brought the great rains and floods of Tropical Storm Agnes, an event that had altered the ecology of the estuary in ways scientists were still trying to figure out.

The problems were many, and the causes not always clear. "We groped our way along," Mathias told me. "There was really no one who had any total solution to the problem." He listened to the stories from watermen and fishermen and Bayshore residents, but he knew anecdotes were not evidence, at least not the kind of evidence that could unleash federal funding.

On his tour stop at Solomons Island he had dinner at Bowens Inn with Gene Cronin and other scientists from the Chesapeake Biological Laboratory. They talked about setting up an in-depth scientific overview of the Bay. "Human experience is not broad enough," Mathias said, "human knowledge is not wide enough without science to identify out of normal everyday experience what was going on."

To build political support for his

Mathias Medal

This award, sponsored by Maryland Sea Grant, Virginia Sea Grant, and the Chesapeake Research Consortium, was named in honor of the politician who valued science. It is awarded to scientists who have contributed to environmental policy in the Chesapeake region. To learn about the scientists, including Eugene Cronin, who have received the medal, visit:
http://www.mdsg.umd.edu/mathias-medal/

Baywide study, Mathias smartly turned his "fact-finding" voyage into a fact-sharing experience. He enticed two prominent officials from the Nixon administration to come aboard his boat: Russell Train, the head of the Environmental Protection Agency, and Rogers Morton, secretary for the Department of the Interior.

Bringing these heavyweights aboard must have been a coup for a first-time senator who was not popular with President Richard Nixon. Mathias had already criticized the president for his civil rights record, his bombing campaigns in Viet Nam, and his poorly qualified Supreme Court nominees. He was also one of the first Republicans to go on the record in support of investigating a growing Watergate scandal. He was beginning to earn his reputation as "the conscience of the Senate."

After five days on the Bay, Mathias ended his boat trip back where he began: in Baltimore. At his press conference Mathias spoke about sewage pollution, called for closer cooperation between Maryland and Virginia, and said he would try to set up "a clearinghouse" of Bay data as a step towards solving the problems he had seen.

Press coverage of the trip helped him publicize the Bay's problems, but his plan would still prove a tough sell with Congress. When he persuaded the Senate Appropriations Committee in 1975 to appropriate $5 million a year for a study, his project was labeled "pork barrel spending." One of the keys to keeping the project alive, said Mathias, was his connection with the Chesapeake science community. "If it hadn't been for the fact that we had some logical, common sense, credible scientists on the scene, like Gene Cronin," he said, "it would have been much more difficult to have sold this project, both to the federal government and to state and local governments."

The EPA study, which began in 1976, would revise popular and scientific thinking about the Bay's major pollution problems. Over 50 separate research projects were funded, and their findings, released in September 1982, pinpointed nutrients, not industrial wastes, as the single most damaging systemwide threat to the health of the Bay. Nutrients, primarily nitrogen and phosphorus, were entering the estuary from hundreds of sewage plants and tens of thousands of farm fields spread across the watershed. They were overfertilizing the estuary and stimulating annual and massive plankton blooms. The study convicted nutrients as the primary culprits behind the dieoff of seagrasses and the spread of low-oxygen and no-oxygen dead zones. The breadth and depth of EPA's research study set off a rising crescendo of debate about who would apply the findings of the study.

The greatest payoff would be a new policy approach to an old policy problem: the lack of coordination among all the players working on Chesapeake research and management issues. Mathias estimated there were 10 federal agencies, 31 state agencies, 5 interstate commissions and 7 universities — more than 50 organizations involved with the Bay.

But among all the players, he said he could find "no ringmaster" able to run the show. Among the scientists advising Mathias were Gene Cronin, his early mentor, and Joe Mihursky, a CBL biologist who was spending his sabbatical working in the senator's office. Both were telling him the job could not be left up to individual states with a history of non-collaboration. There were two-day conferences and three-day conferences that drew most of the major players in Bay restoration, and at one of them he told an audience of 400 attendees, "I want to lock you up here as they do with the College of Cardinals while electing a pope."

Mathias, of course, already had a pope in mind to organize all these Bay believers: William Ruckelshaus, head of the EPA. Since he was proving a reluctant pontiff, Mathias and his allies mounted a quiet campaign in the summer of 1983 to insert language into the Clean Water Act that would recognize the Chesapeake as "a national treasure" and require the EPA to become a financial partner and permanent manager of an ongoing federal program to preserve it. Ruckelshaus, however, was part of a Reagan administration reluctant to expand the federal role in a multi-state environmental issue.

It was time for yet another boat trip, and this one came in July of 1983. The vessel would be the Maryland Governor's yacht, the guest of honor would be the reluctant Ruckelshaus, the host would be Governor Harry Hughes, and the passengers would include the governor of Virginia, the four U.S. senators from Maryland and Virginia, and cabinet officials from three states. "All we want to do right now is impress Ruckelshaus with the Bay, get him involved," said an aide to the governor. The yacht, the *Aurora*, didn't look like the College of Cardinals, but for a long afternoon, it locked up the EPA chief with a lot of political high priests, all praying his agency would take charge of a new Bay program.

When the *Aurora* motored out of Annapolis, it had a busy schedule to meet. Ruckelshaus got to see crab potters, clam

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dredgers, oyster tongers, and oyster divers. On the other side of the Chesapeake, he got to eat a seafood lunch at Kent Narrows.

Boat trips on the Bay can work political miracles, said Bill Eichbaum, then head of Maryland's environmental programs. "You get off the boat, and there is a newspaper guy there, and you've got to say something," said Eichbaum. "If the fish are dying, you can't say 'The Bay is clean!' You've got to say 'We're going to clean it up.'" Putting a politician on a boat puts him on record.

The head of the EPA, William Ruckelshaus *(second from left), is surrounded by politicians as the press asks him about the possibility for a new Chesapeake Bay Program. This 1983 boat trip across the Bay also included (from left to right) Senator Paul Sarbanes, Maryland Governor Harry Hughes, Virginia Senator John Warner, Pennsylvania Senator Arlen Specter, and Virginia Governor Chuck Rabb (far right).*

When Ruckelshaus got off the boat, he found himself besieged by reporters, and he later withdrew his opposition to federal participation. The new Clean Water Act, as a result, called for the EPA to help restore the Chesapeake Bay, and Ruckelshaus is now remembered as a key player in starting the Bay cleanup.

By December of that year, science and politics had laid the foundation for the Chesapeake Bay Agreement of 1983, a one-page statement of intent that promised a collaborative approach, a political rarity in dealing with Bay issues. The original signers were the Governors of Maryland, Virginia, and Pennsylvania, the mayor of Washington, D.C., and the regional administrator of EPA. And they all promised "to improve and protect the water quality and living resources of the Chesapeake Bay estuarine systems."

That language doesn't sound like a Declaration of Independence — it lacks the cadences and litany-like parallelisms of a Thomas Jefferson — but that plain-spoken declaration of 1983 did announce a break, a stepping away from the pessimism of the past, a casting aside of the belief that the Bay was dying and there wasn't much we could do about it.

Ten years after Mathias ran his "fact-finding tour," there was an optimism in the air, a buoyancy born of the belief that scientists were finally defining the major problems, that state and federal agencies would finally design policies that might start the long recovery of a great estuary.

A new voyage was launched, a voyage of discovery designed to test the hopeful idea that ecosystem restoration on such a grand scale might indeed be possible.

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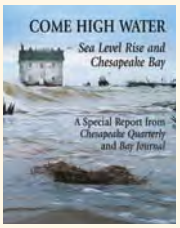
Report on Sea Level Rise



Chesapeake Quarterly and *Bay Journal* teamed up last year to produce a series of articles about sea level rise, coastal flooding, and the Chesapeake Bay. Articles appeared in both print and online. This 72-page, full-color report compiles this content along with a new foreword to offer a comprehensive look at the subject. To order a free copy of this publication, email communications@mdsg.umd.edu or phone (301) 405-7500.